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THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

Volume XXV Number 3

February 15, 1941

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Volume XXV Number 3

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George L. Zundel describes a drying of the fruit of black raspberries, of unknown cause, that is becoming destructive in Western Pennsylvania, page 86.

J. C. Walker emphasizes the importance of the source of inoculum in the control of cabbage black rot epidemics, page 90.

Some diseases of vegetable crops observed in the market-growing regions near San Francisco are reported by John T. Middleton and M. W. Gardner, page 93.

The Botryosphaeria canker of red bud is reported from New Jersey by P. P. Pirone, page 94.

Tests of susceptibility of the southern gooseberry to the white pine blister rust fungus are reported by H. E. Yost, page 96.

J. G. Gaines reports the appearance of tobacco downy mildew in a Georgia seed-bed, page 98. Other brief notes include a report on alfalfa, sugar beet, and tomato diseases observed in Mexico, by M. W. Gardner; Pythium foot rot of cereals in Virginia, by S. B. Fenne; and Vermicularia leaf spot of ivy in Oregon, by F. P. McWhorter.

The hardiness map for the United States, page 99, is reproduced with permission of the Arnold Arboretum.

January weather, page 101.

CHECK LIST REVISION

Freeman Weiss

CLADRASTRIS (LEGUMINOSAE)

CLADRASTRIS LUTEA (Michx.) Koch, YELLOWWOOD. Small tree in Growth Regions 25, 27, 29; also cult. as ornamental.

Botryosphaeria ribis Gross. & Dug., on branches. Pa.
Polyporus spraguei Berk. & Curt., wood rot. Md.

CLAOXYLON (EUPHORBIACEAE)

CLAOXYLON spp. Trees and shrubs of tropical Pacific islands.

Asterina ildefonsiae (Rehm.) Theiss., black leaf patch. T. H.
Meliola morbosa F. L. Stevens, black mildew. T. H.

CLAUCENA (RUTACEAE)

CLAUCENA LANSIUM (Lour.) Skeels, WAMPI. Small tree, native of China, sometimes cult. as ornamental in Fla.

Elsinoë fawcetti Bitan. & Jenkins, scab. Fla.
Glomerella cingulata (Ston.) Spauld. & Schrenk (Gloeosporium clausenae Patters.), leaf spot. Md.
Tylenchulus semi-penetrans Cobb, in roots. Fla.

CLEMATIS (RANUNCULACEAE)

CLEMATIS spp. Numerous spp. of woody climbing vines (and some perennial herbs) endemic and widely distributed in the U. S., especially C. LIGUSTICIFOLIA Nutt., Western virgins-bower, C. VIORNA L., LEATHERFLOWER, and C. VIRGINIANA L., VIRGINS-BOWER. Numerous Asiatic and European spp. and hybrids are also cult.

(Aecidium clematitis DC.): Puccinia rubigo-vera.
Ascochyta clematidina Thuem. emend. Gloyer, leaf spot, stem rot. Widespread.
Cercospora rubigo Cke. & Harkn., leaf spot. Calif., Wash.
C. squalidula Pk., leaf spot. Widespread.
Cylindrosporium clematidis Ell. & Ev., leaf spot. Eastern & Southern States.
Didymaria clematidis Cke. & Harkn., on leaves. Calif., Mont. Utah.
Diplodia spp. (D. hortensis Sacc., D. thalictricola Syd.), on stems. Mich., N. Y.

CLEMATIS--Continued

Dothidella insculpta (Wallr.) Theiss. & Syd., on stems. Mont., N. Mex.
Dothiorella phomopsis Fairm., on stems. N. Mex.
Erysiphe polygoni DC., powdery mildew. Widespread.
Glomerella cingulata (Ston.) Spauld. & Schrenk., leaf spot. Fla.
(Haplosporella clematidis (Dearn. & House) Petr. & Syd.): Physalospora obtusa.
Hendersonia hortilecta Fairm., on stems. N. Y.
Heterodera marioni (Cornu) Goodey, rootknot. Widespread.
Keissleria montaniensis (Ell. & Ev.) Höhn. (Ceriospora m. (Ell. & Ev.) Berl.), on stems. Mont., N. Mex.
Leptosphaeria agminalis Sacc. & Morth., on stems. Oreg.
(Macrosporium clematidis Pk.): Alternaria. On leaves. Kans.
Meliola furcata Lév., black mildew. P. R.
Otthia fruticola Ell. & Ev. (? O. clematidis Earle), on stems. Colo., N. Mex.
Phleospora adusta Heald & Wolf, leaf blight. Texas.
Phyllosticta clematidis Ell. & Dearn., leaf spot. Mont., Va.
Physalospora obtusa (Schw.) Cke., on stems. N. Y.
Phytomonas tumefaciens (EFS.) Bergey, crown gall. Minn.
Puccinia rubigo-vera (DC.) Wint., rust (O and I). The varieties agropyri (Erikss.) Arth. occurring on native Clematis spp. in the Rocky Mt., and Pacific Coast States, and agropyrina (Erikss.) Arth. on native Clematis spp. in the Eastern and Central States have been distinguished (Arthur); and several additional geographic and host races also have been named (Mains). Races of this rust occur also on the introduced spp. The races on Clematis have II and III stages on native grasses.
P. pulsatillae Kalchbr., rust (III). On C. lasiantha Nutt., Calif.
P. stromatica Berk. & Curt., rust (III). Ala.
Ramularia clematidis Dearn. & Barth., leaf spot. Mont.
Septoria clematidis Rob. & Desm., leaf spot. Wash.
(Sphaeropsis clematidis Dearn. & House): Physalospora obtusa.
Urocystis carcinodes (Berk. & Curt.) Fisch, smut. On C. pseudoalpina (Ktze.) Nelson, Utah.

CLERODENDRON (VERBENACEAE)

CLERODENDRON spp., GLORYBOWER. Shrubs or small trees of China, cult. as ornamentals in Gulf States and Calif.; other spp. endemic in West Indies.

Heterodera marioni (Cornu) Goodey, rootknot. Md.
Septoria phlyctaenioides Berk. & Curt., leaf spot. S. Car.

CLETHRA (CLETHRACEAE)

CLETHRA ALNIFOLIA L., WHITE-ALDER, SWEET PEPPERBUSH. Growth regions 25, 27, 28, 29, 30; also CLETHRA Spp., native and Asiatic, cult. as ornamentals.

Diaporthe tuberculosa (Ell.) Sacc. var. corymbosa (Cke. & Ell.) Weh., on dead stems. Md., N. Y.
Godronia urceolus (Alb. & Schw. ex Fr.) Sacc., on twigs. N. J.
Phyllosticta clethricola Ell. & Mart., leaf spot. Md., Mass., N. J.
Physalospora viscosa (Cke. & Ell.) Sacc., on branches. N. J.
Sphaeronema clethrincolum Ell., on branches. N. J., N. Y.
(Sphaeropsis clethricola Cke. & Ell.): Physalospora obtusa.
Steganosporium fenestratum (Ell. & Ev.) Sacc., on branches. N. J.
Synchytrium vaccinii Thomas, red leaf gall. N. J.
Scleroderris crypta (Cke.) Sacc., on branches. N. J.

CLIDEMIA (MELASTOMACEAE)

CLIDEMIA spp. (C. HIRTA (L.) D. Don, CAMASEY and C. STRIGILLOSA (Sw.) DC. TERCIOPELO. Shrubs of Tropical America.

Heterodera marioni (Cornu) Goodey, root knot.
Irene melastomacearum (Speg.) Toro, black mildew. P. R.

CLIFTONIA (CYRILLACEAE)

CLIFTONIA MONOPHYLLA (Lam.) Britt., BUCKWHEAT-TREE. Evergreen shrub, in Growth Regions 29 and 30; occasionally cult.

Morenoella (Lembosia) cliftoniae (Tr. & Earle) Theiss., black leaf patch. Miss.
Pestalotia (Pestalozzia) cliftoniae Tr. & Earle, leaf spot. Miss.

CLUSIA (GUTTIFERAE)

CLUSIA spp. Shrubs or small trees of tropical America, especially C. ROSEA Jacqu., CUPEY, which is a source of medicinal resin and is often parasitic on other trees.

Amazonia (Meliola) clusiae F. L. Stevens, black mildew. P. R.
Asterina solanicola Berk. & Curt. (A. coriacella Speg.), black leaf patch. P. R.
Cephaleuros virescens Kze., algal spot. P. R.
Clithris minor Tehon and C. platyplacum (Berk. & Curt.) Tehon (C. clusiae Tehon), on leaves. P. R.
Coccomyces clusiae (Lév.) Sacc., on leaves. P. R.
Guignardia clusiae F. L. Stevens, on leaves. P. R.

CLUSIA (GUTTIFERAE)

Mycosphaerella clusiae F. L. Stevens and M. guttiferae Miles, leaf spot, P. R.

Parodiopsis (Dimerium) melioides (Wint.) Maubl., black mildew, P. R.
Pestalotia (Pestalozzia) ?funerea Desm., on leaves. P. R.
Phyllosticta clusiae F. L. Stevens, leaf spot. P. R. (P. clusiae ... Allesch., in Brazil, has priority.)
Uredo clusiae Arth., rust (II). P. R.

COCCOLOBIS (Coccoloba) (POLYGONACEAE)

COCCOLOBIS spp. Small trees (C. LAURIFOLIA Jacqu., DOVE-PLUM, and C. UVIFERA (L) Jacqu., SEA-GRAPE) of Florida Keys and West Indies to large trees (C. GRANDIFOLIA Jacqu., MORALON, and C. RUGOSA Desf., ORTEGON and others) in the Greater Antilles and Central America.

Asterina coccolobae Ferd. & Winge, black leaf patch. Virgin Is.
Cephaleuros virescens Kze., algal spot. P. R.
Clypeotrabutia (Trabutia) portoricensis (Stevens) Seaver & Chardon, leaf spot. P. R.
Irenopsis rectangularis F. L. Stevens, black mildew. P. R.
Lembosia spp. (coccolobae Earle, philodendri P. Henn., portoricensis Ryan, tenella Lév.) black mildew. Fla., P. R.
Lembosidium portoricense Speg., black mildew. P. R.
Melasmia coccolobae F. L. Stevens, on leaves. P. R.
Meliola amphitricha Fr. and M. praetervisa Gaill., black mildew. Canal Zone. P. R.
Microclava coccolobae F. L. Stevens, on leaves. P. R.
Pestalotia (Pestalozzia) coccolobae Ell. & Ev., on leaves. P. R.
Phyllosticta coccolobae Ell. & Ev., leaf spot. P. R.
Phyllachora simplex Starb., black leaf spot. P. R.
Scolecopeltis pachyasca Speg., on leaves. P. R.
Seynesia coccolobae Ryan, black leaf spot. P. R.
Uredo coccolobae P. Henn. and U. uviferae Syd., rust (II). Fla., P. R.
Verticicladium effusum Earle, on leaves. Fla.

COCCULUS (MENISPERMACEAE)

COCCULUS CAROLINUS (L.) D C. (Cebatha carolina Britt.), CAROLINA MOON-SEED. Twining shrub, Growth Regions 11, 17, 20, 25, 28, 29, 30. C. TRILOBUS (L.) D C. from E. Asia also is cult. L.)

Cercospora menispermi Ell. Holw., leaf spot. Miss., Texas.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

COCCULUS FERRANDIANUS Gaudich.

Echidnodella cocculi Stevens & Ryan, on leaves. T. H.

COCOS (PALMACEAE)

COCOS NUCIFERA L., COCONUT. Seacoasts of Tropical America reaching S. Fla.

Aphelenchus cocophilus Cobb, red ring disease. Canal Zone, P. R.
Cephalosporium lecanii Zimm., parasitic on scale insects. P. R.
Ceratostomella paradoxa Dade (Thielaviopsis paradoxa (De Seynes) Höhn.) leaf-bitten disease, leaf scorch, stem-bleeding disease. Fla. West Indies.
Corticium koleroga (Cke.) Höhn. (C. Stevensii Burt), thread blight. Fla.
Diplodia epicocos Cke. (Sphaeropsis palmarum Cke.), associated with leaf spot, leaf break, and dieback, but probably secondary. West Indies.
Endocalyx melanoxthanus (Berk.& Br.) Petch (Melanconium melanoxthanum Berk. & Br.), on petioles, ?leaf-break. T. H.
Gloeosporium sp., on leaves. Fla.
Pestalotia (Pestalozzia) palmarum Cke., gray leaf spot, leaf break (probably secondary). Canal Zone, Fla., West Indies.
Phyllosticta sp., on leaves. Fla.
Phomopsis cocoes Petch, on nuts. P. R.
Physalospora fusca N. E. Stevens, on leaves. Fla.
Phytophthora palmivora Butl. (P. faberi Maubl.), bud rot, leaf drop, wilt. Fla., West Indies.
Pythium sp., wilt. Fla.
(Sphaeropsis palmarum Cke.): Diplodia epicocos.
(Thielaviopsis paradoxa (De Seynes) Höhn.): Ceratostomella p.
Bud rot, -- chiefly fungal (see Phytophthora) but in part possibly bacterial following environmental and mechanical injuries. West Indies.
Dieback, leaf-break, -- physiogenic, probably from drought and root rot. West Indies.
Yellow leaf, tapering stem wilt, -- physiogenic, ? malnutrition. West Indies.
Wilt, ?bronze leaf wilt, -- physiogenic, probably drought. West Indies.

ARECASTRUM ROMANZOFFIANUM (Cham.) Becc., (COCOS PLUMOSA Hook.) PLUMY COCONUT, QUEEN PALM, including the var. AUSTRALE (Mart.) Becc. (C. flexuosa Hort.) Endemic in S. America, cult. in S. Calif. and Fla., and in greenhouses. [Omitted in its alphabetic order, included here because most of the records are under Cocos.]

Dothiorella sp. (?Botryosphaeria ribis), gummosis, canker. Calif.
Exosporium palmivorum Sacc., leaf spot. Fla.

COCOS--Continued

Glomerella cincta (Ston.) Spauld. & Schrenk, leaf spot. N. J.
Graphiola phoenicis Pat., false smut, leaf spot. Fla.
Penicillium vermoeseni Biourge, canker. Calif.
Pestalotia (Pestalozzia) palmarum Cke., on leaves. Fla.
Phyllosticta sp., on leaves. Fla.
Phytophthora palmivora Butl., bud rot, wilt. Fla.
Pythium sp., wilt. Fla.
Septoria cocoina Ell. & Ev., leaf spot. Mo.

CODIAEUM

CODIAEUM VARIEGATUM Blume, CROTON (of florists), and CODIAEUM spp. Old World tropical shrubs cult. as conservatory plants and in the open in the far South.

Corticium koleroga (Cke.) Höhn., thread blight. P. R.
Glomerella cingulata (Ston.) Spauld. & Schrenk, leaf & stem spots. Widespread.
Phyllosticta codiaei Stevens & Young, leaf spot. T. H. (P. codiaei Died. has priority)
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

COFFEA (RUBIACEA)

COFFEA ARABICA L., ARABIAN COFFEE. Shrub of tropical Asia and Africa, cult. extensively in S. and Cent. America and less so in the West Indies, also occasionally as an ornamental in the Southern States. (The transfer of coffee culture from Malaya and the Philippines to the Western Hemisphere was due to the depredations of rust, Hemileia vastatrix Berk. & Br., introduced from Africa; this disease is unknown in the Americas.) The following records include a few on C. LIBERICA Hiern. and C. ROBUSTA Linden which are infrequently cult. here.

Capnodium spp., Sooty mold, General. Grows on insect secretions but causes secondary effects on plants.
Cephalosporium sp., zonal leaf spot. P. R.
Cephaleuros virescens Kze., algal spot. P. R.
Cercospora coffeicola Berk. & Curt. (Cercosporina c. (B. & C.) Speg.), brown spot, eye spot (leaves & berries). General.
Colletotrichum coffeanum Noack, anthracnose, brown blight, dieback. General. (Also reported as a conidial stage of Glomerella cingulata.)
Corticium koleroga (Cke.) Höhn., thread blight, koleroga disease, pellicularia. Tropical America.

COFFEA--Continued

Fusarium sp., bark disease, foot rot, P. R.
F. lateritium Nees, twig blight. P. R. (Conidial stage of Gibberella baccata (Wallr.) Sacc.)
F. moniliforme Sheld., seedling blight. P. R. (Conidial stage of Gibberella fujikuroi (Saw.) Wr.)
(Gloeosporium coffeanum Del.): Colletotrichum coffeanum.
Glomerella cingulata (Ston.) Spauld. & Schrenk (Colletotrichum coffeanum Noack), leaf spot, dieback. General.
Heterodera marioni (Cornu) Goodey, root knot, T. H., Tropical America.
Omphalia flavida (Cke.) Maubl. & Rang. (Stilbella flavida (Cke.) Henn.) viruela, iron spot, American leaf disease. West Indies.
(Pellicularia koleroga Cke.): Corticium koleroga.
Rhizoctonia solani Kühn, damping off. Cosmopolitan.
Rosellinia bunodes (Berk. & Br.) Sacc., black root rot. Tropical America.
Scolecopeltis longispora (Earle) Toro, on leaves. P. R.

COLUBRINA (RHAMNACEAE)

COLUBRINA RECLINATA (L'Her.) Brongn. Small tree of the West Indies.

Dictyopeltis (Asterina) colubrina (Ell. & Kelsey) Theiss., black leaf patch. Virgin Is.

COLUTEA (LEGUMINOSAE)

COLUTEA ARBORESCENS L., BLADDER SENNA. Shrub of Mediterranean region cult. as ornamental.

Camarosporium coluteae (Pk. & Clint.) Sacc., on branches. N. Y. (Probably the conidial stage of the following.)
Cucurbitaria elongata (Fr.) Grev. (C. coluteae (Rabh.) Auer.), on dead branches.
Diplodia coluteae Schnabl (?D. mutila (Fr.) Mont.) twig blight. Pa.
Dothidea coluteae Berk. & Curt., on twigs. Pa.
Erysiphe polygoni DC., powdery mildew.
Ganoderma sp., root rot. Okla.
Phomopsis coluteae (Sacc. & Roum.) Died., on leaves. N. J.
Uromyces coluteae Arth., rust (II and III). Kans. (Sometimes given as a var. of U. genistae-tinctoriae (Pers.) Wint.)

COMOCLADIA (ANACARDIACAE)

COMOCLADIA GLABRA (Schultes) Spreng., CARRASCO. Shrub of Tropical America.

Amphinectria portoricensis Speg., on leaves. P. R.
Irenopsis (Meliola) comocladiae F. L. Stevens, black mildew. P. R.
Micropeltidium portoricense Speg., on leaves. P. R.

COMPTONIA (MYRICACEAE)

COMPTONIA PEREGRINA (L.) Coult., including var. ASPLENIFOLIA (L.) Fern. (Myrica asplenifolia L.), SWEETFERN. Growth regions 22, 23, 24, 25, 26, 27, 28.

Cronartium comptoniae Arth., blister rust. (II and III). Me. to Minn., N. Car. to Ohio. O and I (Peridermium comptoniae Orton & Adams) forming stem galls on pitch or hard pines.
Cryptodiaporthe aubertii (West.) Weh. var. comptoniae (Schw.) Weh., on stems. Mass., N. J., N. Y.
Cucurbitaria comptoniae Cke. & Ell., on stems. N. J.
Gymnosporangium ellisii (Berk.) Farl. (G. myricatum Fromme, rust (O and I). N. J. III on Chamaecyparis thyoides (L.) B.S.P.
Neobarclaya flagellifera (Ell. & Ev.) Sacc. (Pestalozzia flagellifera Ell. & Ev.), on stems. Conidial stage of Cryptodiaporthe aubertii var. comptoniae.
Pseudovalsa comptoniae Ell. & Ev. (Thyridaria c. (E. & E.) Berl. & Vogl.), on stems. N. J.

CONDALIA (RHAMNACEAE)

CONDALIA SPATHULATA Gray, SQUAWBUSH. Growth regions 10, 11, 16, 17; occasionally cult.

Phoradendron californicum Nutt., mistletoe. Calif.

CONOCARPUS (COMBRETACEAE)

CONOCARPUS ERECTUS L., BOTONCILLO. Small tree of S. Fla. and Tropical America.

Acanthostigma conocarpi Tr. & Earle, on leaves. Fla.
Irenina (Meliola) laguncullariae (Earle) F. L. Stevens, black mildew. P. R.

CORDIA (BORAGINACEAE)

CORDIA spp. Trees & shrubs of extreme southern U. S. and Tropical America. C. SEBESTINA L., GEIGERTREE occurs in S. Fla. and West Indies; C. BOISSIERII A.DC. in Rio Grande Valley and Southward. Most of the following records on spp. in Tropical America cult. as ornamentals.

Alveolaria cordiae Lagh., rust (III). Canal Zone.
Chaetostigme (Dimeriella) cordiae (P. Henn.) F. L. Stevens on leaves. P. R.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.

CORDIA--Continued

Cryptospora panamensis (Stevens) Syd., on leaves. Canal Zone.
Diatractium (Trabutiella) cordiae (Stevens) Syd. (Hypospila cordiana Ell. & Kelsey), on dead branches, P. R., Virgin Is.
Dimerium stevensii Garman, black leaf patch. P. R.
Irenina (Meliola) longipoda Gaill., black mildew. P. R.
Ophiodothella panamensis F. L. Stevens, on leaves. Canal Zone.
Phyllachora orbicularis Speg., on leaves. P. R.
Puccinia cordiae (P. Henn.) Arth., rust (O, II, III). P. R.
Seynesia cordiae Ryan, black leaf patch. P. R.

COREMA (EMPETRACEAE)

COREMA CONRADII (Torr.) Loud., PLYMOUTH or BROOM CROWBERRY. Evergreen shrub, growth regions 26, 27, 28; occasionally cult.

Cucurbitaria coremae Ell. & Ev., on twigs. N. J.

CORIARIA (CORIARIACEAE)

CORIARIA MYRTIFOLIA L., shrub of S. Europe and Asia, occasionally cult. as ornamental in South.

Dothiorella (Sphaeropsis) macrospora (Berk. & Cke.) Sacc., on stems. Pa.

CORNUS (CORNACEAE)

CORNUS spp., CORNEL, DOGWOOD. Shrubs and small trees, numerous spp. of which are endemic and widely distributed in the U. S. Besides those specifically mentioned C. RACEMOSA Lam. (C. paniculata L'Her.), GRAY DOGWOOD, C. STOLONIFERA Michx., RED OSIER, and several European and Asiatic spp. are cult.

Anthostomella cornicola Ell. & Ev., on dead branches. Wash.
Apioporthe corni Weh., on branches. Mich., N. Y.
Armillaria mellea Vahl ex Fr., root rot. N. Y., Wash.
Ascochyta cornicola Sacc., leaf spot. Ohio, Wis.
Botryosphaeria ribis Gross. & Dug., canker. Pa.
Botrytis cinerea Pers., gray mold (buds & berries.) Occasional.
Cercospora cornicola Tr. & Earle, leaf spot. Southern States.
Corticium koleroga (Cke.) Höhn. (C. stevensii Burt), thread blight. La.
Coryneum cornicola Ell. & Ev., on twigs. Mich.
Cryptosporiopsis cornina (Pk.) Petr. & Syd., twig blight. Widespread. Conidial stage of Pezicula corni Petr.

CORNUS--Continued

Cytospora corni West. and Cytospora sp., on twigs, ?dieback. Kans. N. J. Conidial stage of Valsa.
(Dermatea corni Phil. & Harkn.): Pezicula corni.
(Diaporthe albocarnis Ell. & Ev.): Leptosphaeria sp. and possibly Apioporthe corni in part. Canker. Eastern States to Colo.
D. eres Nit. (D. cornicola Ell. & Holw.), on branches. Iowa.
D. pardalota (Mont.) Fckl. (D. brenckleana Sacc., D. corni Fckl.) on branches. Conn. to Md., Minn. and N. Dak.
Dimerosporium pulchrum Sacc., sooty mold. Southeastern and Gulf States to Wis. (An obsolete name; the conidial stage is Sarcinella heterospora Sacc.)
Erysiphe tortilis Wallr. ex Fr., powdery mildew. Mo. (Recorded only once, on cult. C. sanguinea L.)
Gloeodes pomigena (Schw.) Colby, on twigs. Ind.
Hendersonia fiedleri West., H. pallida Berk. & Curt. (?Stagonospora cornicola Earle), on twigs. Occasional.
Leptosphaeria sp. (Diaporthe albocarnis Ell. & Ev.), on branches. N. Y.
(Macrophoma cornina (Pk.) Sacc. and M. paniculata (Ell. & Dearn.) Sacc. & Syd.): Cryptosporiopsis cornina (Pk.) Petr. & Syd.
Meliola nidulans (Schw.) Cke., on leaves & twigs. N. Car., Tenn. and Gulf States.
Microsphaera alni DC. ex Wint., powdery mildew. Eastern States to N. Car., Central States.
Mycosphaerella cornicola Tehon & Daniels, on twigs. Ill.
Myxosporium nitidum Berk. & Curt., twig blight. Northeastern and Central States to Colo. Reported as the conidial stage of Diaporthe albocarnis.
Nectria cinnabarina Tode ex Fr., on branches. Occasional.
Pezicula corni Petr. (Cryptosporiopsis cornina (Pk.) Petr. & Syd.), on dead branches. Widespread.
P. cornicola Seaver, on dead branches. N. Y.
(Phoma corni Fckl.): Diaporthe pardalota.
(P. cornina Pk. and P. paniculata Ell. & Dearn.): Cryptosporiopsis cornina.
Phomopsis (Phoma) corni (Sacc.) Trav.: Diaporthe pardalota. Mass., Md., N. Y.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Widespread.
Phyllosticta globifera Ell. & Ev. (=P. cornicola (DC. ex Fr.) Rabh.?), leaf spot. Eastern and Central States.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora everhartii Sacc. (P. corni Ell. & Ev., ?P. obtusa), on dead branches. Colo.
P. obtusa (Schw.) Cke., on dead branches. N. Y., Va.
Ramularia gracilipes J. J. Davis and R. stolonifera Ell. & Ev., leaf spot. Wis.
Sarcinella heterospora Sacc., on leaves. Widespread.
Sclerotinia (Monilia) corni Reade, on leaf parts. N. Y., Wis.

CORNUS--Continued

Septobasidium spp., felt fungus. Va. to Fla. and La. Numerous spp. reported, none noted as particularly injurious, though S. curtisii (Berk. & Desm.) Boed, & Stein. may cause witches' brooms.
Septoria cornicola Desm., leaf spot. Eastern and Central States southward, Pacific Northwest.
Sphaeropsis cornicola Dearn., on twigs. Md.
(S. cornina Pk.): Cryptosporiopsis cornina.
Valsa ambiens Pers. ex Fr., on branches. Occasional. V. cornina Pk. and V. cornicola Cke. also reported.

CORNUS CANADENSIS L., DWARF CORNEL, BUNCHBERRY. Northeastern and Lakes States, Pacific Northwest and Alaska.

Glomerularia corni Pk., on leaves. Me. to Wis., Oreg.
Pezizella oenotherae (Cke. & Ell.) Sacc., on leaves & stems. Me., N. H.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Wash.
Phyllosticta sp., leaf spot. N. Y.
Puccinia porphyrogenita M. A. Curtis, rust (III). General.
Ramularia sp., leaf spot. N. Y.
Septoria canadensis Pk., leaf spot. Wash., Alaska.
Venturia clintoni Pk., on leaves. Alaska.

CORNUS FLORIDA L., FLOWERING DOGWOOD. Growth regions 20, 22, 23, 24, 25, 27, 28, 29, 30. Including the var. RUBRA West., PINK DOGWOOD, cult. in same range.

Cercospora cornicola Tr. & Earle, leaf spot. N. C. to Texas.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Corticium galactinum (Fr.) Burt., root rot. Md.
Cryptostictis sp., twig blight. N. J.
Cytospora sp., on branches, ?canker. N. J.
Daedalea confragosa Bolt. ex Fr., butt rot. Md. to Tenn.
Fomes scutellatus (Schw.) Cke., wood rot. Md.
(Haplosporella parallela (Dearn. & House) Petr. & Syd.): Physalospora obtusa.
Leptosphaeria olivispora (Berk. & Curt.) Sacc., on dead branches. S. C.
Melanconis corni Weh., on twigs. Ga.
Microsphaera alni DC ex Wint., powdery mildew. Widespread.
Mycosphaerella cornifolia (Schw.) Lind., on twigs. Ala., S. C.
Myxosporium everhartii Sacc. & Syd. (M. corni Ell. & Ev.), twig blight. Mich., Tenn.
Phoma florida Dearn. & House, on twigs. N. Y. Probably the conidial stage of Mycosphaerella florida.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Widespread.
Phyllosticta globifera Ell. & Ev., leaf spot. N. J. to Ind. & Tenn.

CORNUS--Continued

P. starbeckii Sacc. & Syd. (P. corni (Schw.) Starb.), leaf spot. Pa. Va. Possibly not distinct from the preceding or from certain Phoma spp. reported on Cornus, and probably a conidial stage Mycosphaerella.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora obtusa (Schw.) Cke., on branches. N. Y., Va.
P. rhodina (Berk. & Curt.) Cke. La.
Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot. Mass., N. J., N. Y.
Polyporus spp. (P. adustus Willd. ex Fr., P. albellus Pk., P. dichrous Fr., P. tulipiferus (Schw.) Overh., P. versicolor L. ex Fr.), wood rot. Occasional.
Poria vaporaria Pers. ex Fr., wood rot. Md.
Septobasidium spp., felt fungus. Va., to Gulf States.
Septoria cornicola Desm., leaf spot. General. Reported not to infect pink var. in N. J.
S. floridae Tehon & Daniels, leaf spot. Ill.
Sphaeropsis sp., twig blight. N. J.
(S. parallela Dearn. & House): Physalospora obtusa.
Stereum purpureum Pers. ex Fr., N. Y.
Stictis stigma Cke. & Ell., on twigs. N. J., Va.
Leaf scorch, -- water deficit. Frequent in Southeastern States.

CORNUS NUTTALLII Aud., PACIFIC DOGWOOD. Growth regions 1, 2, 3, 4, 5.

Fomes igniarius (L. ex Fr.) Kickx., heart rot. Oreg.
Nectria coccinea Pers. ex Fr. and N. galligena Bres., trunk canker. Oreg., Wash.
Phyllactinia corylea Pers. ex Karst., powdery mildew. General.

(Division of Mycology and Disease Survey.)

A NEW BLACK RASPBERRY DISEASE IN WESTERN PENNSYLVANIA

George L. Zundel

For a number of years a condition occurring in certain black raspberry patches in Western Pennsylvania, characterized by drying of the berries, has been constantly drawn to the attention of the writer while checking diseases in that part of the State. Up until 1939 no particular attention was paid to this condition since it was considered that weather or lack of pollination or some other ecological factor was responsible. In a large number of instances dry weather was said to have caused the berries to dry up.

However, during the summer of 1939 the writer was called to Lawrence County to examine a raspberry patch because of drying of the berries. Drought could not have been the cause in this case because there had been plenty of rainfall and furthermore the raspberry patch was situated on a portion of the farm where there was plenty of moisture. Lack of pollination was suggested as the cause of this condition but even this diagnosis was puzzling because of the presence of 3 or 4 hives of bees on the edge of the patch. It was, therefore, supposed that owing to the excessive rainfall at blossoming time, it was not possible to get proper pollination. In cutting across the drupelets, it was found that the seed had not developed. With this the matter was dropped for 1939.

In the late spring of 1940 raspberry specimens with this trouble were again sent in to the laboratory at State College, since none of the previous diagnoses had been satisfactory. Some of these specimens were sent to the Ohio Experiment Station at Wooster and a report was received that a similar condition was reported around Wooster, Ohio, and that it was considered to be a specific disease. The name of "brown berry disease" is suggested for this condition until more is known about it.

The trouble is characterized by the browning and hardening of the berry to such an extent that it adheres to the receptacle very firmly. It is somewhat difficult to separate the little drupelets. The disease may attack 100 percent of the berries in any given cluster. The early symptons have not been observed by the writer but growers say that soon after blossoming time and berry formation the berry becomes water-soaked, appearing whitish; later, or when the berry is killed, it turns brown. This statement seems to be correct since during a visit to Butler County a raspberry patch was examined where some of the unripe late berries had a watersoaked appearance and different stages were visible down to the final killing and browning.

In August, 1940, the writer made a trip to Western Pennsylvania to check on raspberry diseases. The 1940 visit to the Lawrence County raspberry patch mentioned above revealed that the disease had spread and had developed in severity since the 1939 visit.

Table 1 gives the results of counts of 100 fruit clusters in this raspberry patch near New Castle, Lawrence County. The number of healthy and diseased berries is given for each cluster. It will be noted that out of a total of 864 berries 702 were browned and worthless. In the lower part of this patch, consisting of about 1/2 acre and partially surrounded by woods, the disease was so severe that less than 5 quarts of berries had been picked. These counts represent very conservatively the percentage of loss to this grower. He has grown raspberries for the last 10 years or more and depends on them for part of his livelihood and is considered to be one of the best berry growers in Lawrence County.

Table 2 gives the results of counts of 100 fruit clusters in a raspberry patch in Butler County. It was noted that the diseased condition was more severe in the Cumberland variety than in adjacent rows

TABLE I

RASPBERRY CLUSTER COUNTS IN A RASPBERRY PATCH,
Lawrence County, Pennsylvania
August 18, 1940
(Cumberland Variety)

Fruit cluster	Number berries Healthy	Diseased	Fruit cluster	Number berries Healthy	Diseased	Fruit cluster	Number berries Healthy	Diseased
1	3	4	37	0	7	71	2	7
2	4	5	38	3	6	72	3	4
3	4	3	39	2	8	73	1	7
4	1	7	40	2	9	74	1	10
5	4	4	41	0	9	75	2	6
6	1	9	42	0	5	76	1	8
7	0	7	43	0	7	77	0	6
8	3	3	44	0	5	78	2	9
9	2	4	45	2	14	79	0	14
10	1	9	46	5	8	80	2	8
11	1	6	47	1	9	81	0	14
12	0	6	48	4	6	82	3	10
13	0	9	49	3	3	83	0	4
14	1	7	50	0	6	84	3	9
15	1	7	51	0	8	85	0	6
16	1	5	52	2	7	86	1	5
17	1	8	53	3	5	87	2	6
18	6	2	54	4	6	88	1	8
19	5	3	55	1	6	89	0	9
20	3	7	56	4	9	90	2	12
21	2	5	57	0	6	91	1	14
22	5	7	58	1	6	92	0	5
23	4	6	59	2	4	93	0	6
24	3	7	60	0	7	94	0	9
25	4	1	61	1	10	95	0	6
26	1	5	62	0	7	96	0	9
27	0	7	63	3	6	97	0	9
28	2	6	64	1	10	98	2	13
29	3	6	65	1	8	99	2	10
30	0	13	66	2	6	100	0	8
31	3	5	67	3	6			
32	1	7	68	3	7		162	702
33	2	5	69	1	8		or	
34	1	7	70	1	6		81.2 percent diseased	
35	1	7						
36	3	4						

TABLE II

RASPBERRY CLUSTER COUNTS IN A PATCH IN
Butler County, Pennsylvania
August 19, 1940
(Cumberland Variety)

Fruit cluster	Number berries Healthy	Diseased	Fruit cluster	Number berries Healthy	Diseased	Fruit cluster	Number berries Healthy	Diseased
1	3	3	32	7	1	63	3	4
2	5	5	33	7	2	64	4	4
3	6	2	34	1	8	65	1	7
4	2	5	35	6	1	66	5	4
5	3	8	36	3	5	67	5	8
6	1	6	37	3	6	68	6	2
7	4	3	38	1	11	69	2	7
8	1	5	39	1	11	70	2	7
9	6	2	40	1	7	71	3	5
10	6	11	41	4	7	72	5	7
11	6	1	42	1	8	73	6	4
12	4	5	43	5	5	74	5	6
13	5	3	44	1	3	75	7	6
14	5	4	45	4	2	76	4	5
15	4	5	46	8	9	77	3	6
16	5	4	47	0	8	78	4	8
17	3	4	48	2	8	79	4	10
18	5	4	49	0	6	80	0	12
19	2	5	50	3	1	81	0	15
20	5	5	51	8	3	82	0	3
21	4	8	52	5	0	83	0	9
22	3	7	53	8	2	84	9	6
23	4	4	54	7	8	85	1	6
24	6	6	55	2	9	86	1	4
25	6	6	56	1	11	87	4	0
26	2	10	57	1	12	88	5	6
27	4	6	58	0	9	89	11	7
28	8	1	59	0	8	90	7	7
29	3	5	60	4	4	91	3	0
30	2	11	61	6	4	92	4	2
31	1	6	62	3	4	93	8	7
						94	5	7
						95	2	7
						96	4	7
						97	3	3
						98	5	7
						99	4	0
						100	4	0
							376	608

or
61.8 percent
diseased

planted with the variety Plum Farmer. This farmer has been a grower of certified raspberry plants for the last 7 or 8 years and always has his patch in the best cultural condition and does exceptionally good roguing.

Mr. Albert Hildebrandt, a graduate student, is attempting to determine the cause of this disease. To date he has isolated a bacterium and a fungus from the brown berries but has had no opportunity to determine the pathogenicity of either organism. There is also a possibility that the disease is caused by a virus.

The finding of control measures for this condition is urgently necessary; otherwise, the entire black raspberry industry in Western Pennsylvania is threatened with extinction.

This trouble has been reported from the Counties of Erie, Venango, Lawrence, Butler, and Beaver. (Pennsylvania State College.)

ORIGIN OF CABBAGE BLACK ROT EPIDEMICS

J. C. Walker

Coincident with the relegation of cabbage yellows to a less important position insofar as economic loss is concerned through the development and increased use of yellows-resistant varieties, black rot (Bacterium (Phytomonas) campestre (Pam.) EFS) has come to the foreground as a serious disease. This is largely owing to neglect of the following fundamental facts which have already been established through research:

(1) The pathogen is commonly seed-borne and unless seed is Puget-Sound grown it should be hot-water treated.

(2) It lives over in diseased refuse even in northern States for at least one year and therefore rotation and seed-bed sanitation are necessary.

(3) It is spread readily in environment favorable to it during the growing season, and this phase is particularly important in the seed bed.

(4) Infection may take place early and external symptoms disappear while the pathogen remains dormant or makes slow internal progress especially during the cool early part of the growing period; but it becomes active systemically with the increasing summer temperature resulting in a "sudden" epidemic about the time plants are beginning to head. Most late-season epidemics are the result of seed-bed infection even though an "apparently healthy" period extending for 6 weeks or so may have intervened after transplanting.

The occurrence of black rot in Wisconsin in 1940 was extensive and severe on both cabbage and cauliflower. The cauliflower crop in the northeastern part of the State was reduced 15 to 25 percent by black rot and the secondary development of soft rot. None of the seed was treated. Since cauliflower seed from abroad (and practically all of the Snowball type comes from abroad) is common infected this epidemic is readily accounted for.

In the Shiocton area of Outagamie County the disease was very severe on cabbage. In many fields the loss was up to 50 percent and in one 10-acre field the loss was 100 percent. Curiously, most of this acreage was grown from Puget-Sound-grown seed. A study of the epidemic showed that the acreage is very intensive in the choicer river bottom soil (Wolf River) and disregard of seed-bed sanitation was very general. For instance, the grower who lost an entire 10 acres had his seed bed on the edge of a field in which cabbage affected with black rot grew last year. Furthermore, in the spring of 1940 this grower sent part of his seed to Missouri and the early plants grown there produced a satisfactory crop although planted adjacent to the field where complete loss occurred. The only evidence of black rot in this early field was occasional late-season marginal leaf infection, which would be expected to result from current-season spread from the adjacent heavily infected field. Another grower using seed from the same lot, having had some loss from black rot in 1939, moved his seed bed from the farm in 1940 and sowed his seed in a region free from contamination. The plants were set on the home farm. Careful search in this field failed to reveal a single case of black rot. This seems to prove beyond any question that the Puget Sound seed was free from the black-rot organism and substantiates the statement that seed produced in that area is free from black leg and black rot.

Further evidence of overwintering inoculum as the source of the pathogen in this Shiocton area was shown on a third farm. This grower had not grown cabbage for several years but in 1940 he had a mild epidemic of black rot in his field which was grown from Puget Sound seed. His seed bed was on soil that had not grown cabbage at least for several years. On further study, however, it was found that the seed bed, though on "clean" soil, was separated only by a barbed wire fence from a neighbor's field which in 1939 suffered severely from black rot. The neighbor had "practiced sanitation" by going on to "clean" soil for his seedbed in 1940 but he merely moved off the edge of the 1939 field in an opposite direction from his neighbor. Thus 2 seedbeds were grown on "clean" soil but on the opposite edges of a black rot field of 1939. The respective fields from these 2 seedbeds had plenty of black rot in 1940, due undoubtedly to infected leaves which are readily blown by the wind for some distance in the previous fall. This is obviously an important phase of local spread. The lower leaves are dropped early from black-rot-infected plants and as they desiccate they are readily blown to adjoining areas even before the crop is mature and still more after harvest unless prompt plowing is practiced.

It is obvious that something more is needed than the mere going through the motion of seed bed rotation and sanitation. I have encountered the same situation in various parts of the country. It behooves farm advisers to spend more time educating growers as to the real basic facts underlying these control procedures. As a rule I have found intelligent growers willing to practice control measures if they understand the underlying reasons for them but the lack of such sound basic information in the hands of growers is sometimes appalling. It is not easy to determine the source of a black-rot epidemic, but unless this is done sound advice cannot be given. The growers in the Shiocton area have apparently been of the opinion that the use of black-rot-free seed was sufficient and when the disease persisted the first reaction was to blame the seed as a source of inoculum, while the fundamental principles of local sanitation, not being generally understood, were usually ignored.

In southeastern Wisconsin black-rot was attributable to introduction of the pathogen on seed and on southern-grown plants. Owing to seed-crop shortage of the Bugner variety at least one lot of Danish-grown Bugner was distributed in that area and since many growers probably were unaware of its source it was not treated. Wherever this lot was planted more or less black rot occurred. In one case it happened to be planted in the same field with a crop from Puget-Sound-grown seed. The disease was prevalent in the crop from foreign seed but not in that from Puget-Sound-grown seed.

The transport of cabbage plants particularly from the South, is a common source of black rot in northern areas. In order to secure some facts on the current situation 12 lots of cabbage plants were purchased in May from 4 southern plant growers and planted at Madison in an isolated area free from black rot. About 50 days later the incidence of black rot was determined. The results are given in table 1.

Table 1. --Occurrence of black rot at Madison, Wisconsin, in 12 lots of southern-grown cabbage plants; notes 50 days after transplanting; 1940

Variety	Plant growing location	Total plants	Black rot
		Number	Percent
Marion Market	Valdosta, Ga.	198	20
Copenhagen Market	do.	194	36
Resistant Detroit	do.	201	25
Golden Acre	Tifton, Ga.	194	1
Resistant Detroit	do.	135	1
Copenhagen Market	do.	199	5
Marion Market	do.	171	3
Copenhagen Market	Texarkana, Ark.	185	5
Golden Acre	do.	192	5
Marion Market	Valdosta, Ga.	95	0
Resistant Detroit	do.	94	1
Golden Acre	do.	88	0

Only 2 of the 12 lots were free from diseased plants. Three of the lots, all from one grower, showed each 20 percent or more diseased plants.

When epidemics of black rot appear, the source of infection may not be easy to discern. Most often the source of the pathogen is the seed bed where it may have been introduced through the seed or from carryover inoculum. Seed bed rotation alone is not adequate to prevent the latter for due attention must be given to outside contamination. Introduction of one small infected seed lot into a seed-bed may serve to contaminate all adjoining lots. Thus it usually requires some intelligent, thorough investigation of all the facts in the case to find the origin of an epidemic and until that is done sound advice cannot be given.

(Agent, Division of Fruit and Vegetable Crops and Diseases, U. S. Bureau of Plant Industry.)

FUNGUS DISEASES OF TRUCK CROPS NEAR COLMA, CALIFORNIA

John T. Middleton and M. W. Gardner

The following is a list of fungus diseases of truck crops observed in the Colma market garden region south of San Francisco in the fall of 1940.

Bean: Anthracnose (Colletotrichum lindemuthianum) in one home garden; Botrytis leaf spot; powdery mildew (Erysiphe polygoni).

Beet and Swiss chard: Downy mildew (Peronospora schachtii); leaf spot caused by Cercospora beticola; rust (Uromyces betae).

Cabbage and cauliflower: Downy mildew (Peronospora parasitica); root rot caused by Phytophthora megasperma; ring spot caused by Mycosphaerella brassicicola. Cabbage: Powdery mildew (Erysiphe polygoni); Botrytis leaf spot. Cauliflower: Clubroot, caused by Plasmodiophora brassicae, on the same farm reported by Tompkins and Ark, P. D. R. 23: 1939.

Carrot: Leaf blights caused by Cercospora carotae and Macrosporium carotae.

Celery: Blight caused by Septoria apii-graveolentis.
Chicory (Cichorium intybus): Rust (Puccinia hieracii).
Garlic: Rust (Puccinia porri).
Horse radish: Leaf spot caused by Cercospora armoraciae.
Lettuce: Downy mildew (Bremia lactucae).
Onion: Downy mildew (Peronospora destructor)

Potato: Late blight caused by Phytophthora infestans.
Squash: Powdery mildew (Erysiphe cichoracearum); Fusarium foot rot (W. C. Snyder, Phytopath. 28: 19. 1938).
Tomato: Early blight caused by Alternaria solani; leaf mold (Cladosporium fulvum).

(Division of Plant Pathology, University of California, Riverside and Berkeley.)

CANKER OF RED BUD IN NEW JERSEY

P. P. Pirone

During the last three years, arborists and nurserymen in New Jersey have called the author's attention to a die-back of red bud (Cercis canadensis) in ornamental plantings. The symptoms are unlike those produced by low temperatures or water-logged soils. This disease is characterized at first by a decrease in branch vigor. The branches become progressively weaker and eventually die. In a few cases, entire trees have succumbed.

Elliptical, sunken cankers varying from 1/2 to 2 inches in length are generally present on affected branches. On older cankers the bark is usually cracked and the margins of the cankers are surrounded by raised, calloused tissue. The wood beneath the cankers varies from brown to black and the discoloration nearly always extends longitudinally in the branch to a greater distance than it does laterally. The affected wood is discolored to a considerable depth, often reaching to the center of the branch.

When a canker completely girdles a branch, the distal portion dies. Death or weakening of branches, however, has been observed where cankers did not completely girdle the branch. In such cases as many as 5 or 6 partially developed cankers were so placed along the stem as to produce the same effect as a single completely girdling canker.

Cause

A fungus has been constantly isolated from the margins of the cankers during the past 2 years. This fungus formed a white cottony aerial growth over a brownish-black substratum on potato dextrose agar. To date spores have never been noted in pure cultures. The same fungus was isolated from cankered red bud branches submitted by Mr. Hollis Howe, City Forester of Baltimore, Maryland during the fall of 1940.

A recent article by Alice J. Watson of the Division of Forest Pathology and Mycology and Disease Survey in the Plant Disease Reporter (25: No. 1, 29-31, 1941) designates the fungus responsible for the

canker disease. Miss Watson states that the causal organism is Botryosphaeria ribis chromogena Shear, Stevens and Wilcox. Her isolations were made from red buds collected in Maryland and North Carolina, as well as from a single spice bush plant (Benzoin aestivale) in Maryland. Miss Watson points out that Lucia McCulloch of the U. S. Horticultural Station at Beltsville has been studying the same organism for the past year and that Miss McCulloch established the rules of proof of pathogenicity in the summer of 1940.

A closely related fungus Botryosphaeria ribis has been known to attack currants in nature for a long time. The principal difference between this fungus and that on red bud is the failure of the former to produce a reddish pigment when grown on corn meal agar.

Present Work

The present report seeks to corroborate Miss McCulloch's work on pathogenicity as well as to add a new host and some local field observations. This work has been conducted independently of all other investigators.

In the fall of 1940 6 dormant red bud trees and 2 Chinese red buds (C. chinensis) were set in 12-inch pots in the greenhouse. By mid-December a sufficient number of new shoots, as well as leaves on the older wood, had developed on both species to permit inoculation work. Bits of agar containing the fungus were applied to both wounded and unwounded leaves, shoots and old wood. The inoculated areas were covered with moist absorbent cotton and wrapped in lead foil. Adequate checks, with and without wounds, were also included in the trials.

Observations made from 2 to 3 weeks later revealed that no infections occurred where the fungus was applied to unwounded leaves, green shoots or woody stems. Positive infections developed where the green shoots and woody stems were wounded prior to the insertion of the fungus. Wilting and death of the green shoots occurred within 3 weeks after inoculation--the stem in the vicinity of the wound becoming blackened and shriveled.

The fungus appeared to spread more rapidly in native red bud twigs than in the young stems of Chinese red bud. The wound inoculations in the older wood of both species did not result in so rapid infection as in the young shoots. Nevertheless, discoloration in the wood of older stems was quite apparent within three weeks after inoculation. Within 3 weeks the discoloration in Chinese red bud extended an inch above and below the point of insertion of the fungus. Discoloration of the wood, laterally, appeared much less extensive, having progressed less than 1/8 of an inch on either side of the point of inoculation.

The fungus reisolated from all artifically inoculated stems appeared to be identical with the one originally used. A second series of

inoculations was made early in January, 1941, using isolates from New Jersey and Maryland. Twenty older stems and young twigs were inoculated and the results produced were similar to the first series of inoculations. Reisolations were again positive.

Although cankers have not yet been found on Chinese red bud in nature, the present work suggests that this species is susceptible to the disease.

Control

The author is unaware of any reported control measures. A few arborists have attempted to remove cankers by surgical means but have met with little success. The following suggestions are worthy of further attempts at control in ornamental plantings.

Inasmuch as field observations show that branch cankers originate mainly at the point of twig attachment, it is apparent that the fungus probably enters the large branches through infected lateral twigs. It is not yet clear how the twigs become infected.

Heavily cankered branches are beyond repair and should be cut back to the point of attachment to the trunk or larger branches. The chances of completely removing infected wood by surgical means are rather small because the fungus penetrates well beyond the cankered area and in some instances to a considerable depth into the wood.

Until carefully executed tests on canker excision are made, we can only suggest that wounds be avoided as much as possible and that all cut surfaces be disinfected and then dressed with a good tree paint. In addition, the soil should be well fertilized and good drainage ensured to increase the tree's vigor.

(From New Jersey Agricultural Experiment Station Department of Plant Pathology Nursery Disease Notes 13:21-24, December, 1940. No. 6.)

FIELD TESTS ON THE SUSCEPTIBILITY OF THE SOUTHERN GOOSEBERRY, RIBES CURVATUM, TO CRONARTIUM RIBICOLA

H. E. Yost

Ribes curvatum (Small) Coville & Britton has been found in the white-pine-growing regions of Murray County, Georgia, and Bledsoe, Cumberland, Hamilton, and Rhea Counties, Tennessee. No white pine blister rust has been found within several hundred miles of this region, therefore it seemed desirable to determine the susceptibility of this species of Ribes to the disease under conditions of natural infection.

Spaulding reported Ribes curvatum susceptible to aeciospores from Pinus strobus 1/. He also reported a medium degree of infection following inoculations in the greenhouse and out of doors. In these tests it appeared to be about equal in susceptibility to cynosbati, hirtellum, and glandulosum, which are the principal wild species of Ribes found in the East.

On April 1, 1940, 35 specimens of Ribes curvatum from Murray County, Georgia, were transplanted in three groups in the vicinity of Swallow Falls, Garrett County, Maryland. There were approximately 150 heavily infected white pine trees within a radius of 200 feet of these bushes. Native R. rotundifolium was present in great abundance on the same site and R. glandulosum and cynosbati also occur nearby. A few of the plants were artificially inoculated, although most of them were exposed only to natural infection from nearby diseased white pine.

At frequent intervals throughout the summer the Ribes curvatum plants were observed and compared with the native species. Probably owing to their having been transplanted, the leaves did not appear until about two weeks later than those on the native species. Flowers were produced but they did not set fruit. The initial infection caused by the aeciospores was lighter on R. curvatum than on R. rotundifolium; however, by late summer there was no marked difference between the degree of infection on the two species or between the R. curvatum bushes artificially and those naturally inoculated. Many of the leaves of each species died and fell prematurely, probably because of the extremely heavy infection. In some cases the leaves of R. curvatum became necrotic within and immediately adjacent to infected spots more readily than did those of R. rotundifolium. General observations thus indicate that R. curvatum is approximately equal in susceptibility to R. rotundifolium and R. cynosbati.

Identification of the disease was verified by the Division of Forest Pathology, Bureau of Plant Industry, U. S. Department of Agriculture. No marked difference was observed in the appearance of the telial columns, of the sporidia, or of the volume of sporidia of this species and those of R. rotundifolium and R. cynosbati.

All the Ribes curvatum plants were destroyed at the end of the growing season to prevent the possibility of their becoming established in Maryland.

(Agent, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. December 5, 1940.)

BRIEF NOTES ON PLANT DISEASES

TOBACCO DOWNY MILDEW: Blue mold [downy mildew] (Pernospora tabacina) was observed on February 10, 1941, in a tobacco plant bed in Colquitt County about 25 miles from Tifton, Georgia. It was an old plant bed location, and at the time the grower prepared and sowed the bed, December 18, 1940, many volunteer tobacco seedlings were present. One end of

1/ Spaulding, Perley, Investigations of the White Pine Blister Rust U. S. Dept. Agr. Bul. 957: 17, Table I. 1922.

the bed was left undisturbed and the tobacco cloth was drawn over to protect these plants. According to the grower, the disease was apparent on the old plants about 10 days ago, and at the present time, February 10, all of the hold-over plants have been killed and the infection was present in the edge of the newly seeded area. (J. G. Gaines, Division of Tobacco Investigations.)

ALFALFA, SUGAR BEET, AND TOMATO DISEASES OBSERVED IN MEXICO: Mr. Nathan Stahler, graduate student, found alfalfa leaf spot caused by Pseudopeziza medicaginis at Orizaba, Mexico, January 1, 1941, (ascospores present); alfalfa downy mildew (Peronospora trifoliorum) at Puebla, Mexico, January 5, 1941; sugar beet rust (Uromyces betae) at Mexico City, January 6, 1941; and tomato bacterial spot caused by Bacterium vesicatorium [Phytomonas] at Mante, Mexico, January 6, 1941. (M. W. Gardner, Division of Plant Pathology, University of California, Berkeley, California.)

PYTHIUM FOOT ROT OF SMALL GRAINS REPORTED IN VIRGINIA: During the past few weeks numerous complaints have been received from County Agents and farmers regarding the blighting of wheat, oats, barley, and rye seedlings. A number of farms in Montgomery, Wythe, and Bland Counties were visited and samples collected. In some of the fields severe injury had occurred. For instance, in one wheat field about 20 percent of the plants in a one-acre plot had been killed, and in a barley field of approximately 20 acres about 15 percent of the plants were dead. These foot rots appeared to be most severe in those fields where unfavorable growing conditions were present. As a whole this has been a very unfavorable growing season for small grains. No seedling blight was observed in fields planted with seed treated by approved disinfectants. Mr. R. G. Henderson, of the Virginia Agricultural Experiment Station, who cultured the fungus from field specimens, identified the causal organism as a species of Pythium.

(S. B. Fenne, Extension Plant Pathologist, January 28.)

VERMICULARIA TRICHELLA ON HEDERA HELIX IN AN OREGON GREENHOUSE: We have found several plants of an unnamed compacted ivy affected with the fungus Vermicularia trichella in a greenhouse near Oregon City, Oregon. The fungus produces spots which are suggestive of an anthracnose disease. The spots are irregular in outline, average a centimeter across, and are of varying lengths, ashen-gray toward the centers and strongly marginate with raised edges. These spots are larger and lighter in color than the bacterial leaf spot usually found in Oregon greenhouses. This is the first time we have observed this fungus in this State.

(Frank P. McWhorter, Plant Pathologist, Oregon Agricultural Experiment Station, January 24.)

"A HARDINESS MAP FOR THE UNITED STATES"

The accompanying map and quotations and the list of indicator plants are reproduced from the Bulletin of Popular Information of the Arnold Arboretum, Harvard University (Series 4, 8:61-63. Pl. VII. Nov. 1, 1940). The map was ".....first published in Hedges, Screens and Windbreaks by Donald Wyman in 1938, and later adopted and enlarged to include Canada by Alfred Rehder in the second edition of his Manual of Cultivated Trees and Shrubs (1940)....." It was also published by Donald Wyman in "Hardiness zones in the United States" (Parks and Recreation 23:507-510, July 1940).

"Hardiness of plants is an indeterminable quantity, based not only on a plant's resistance to minimum temperatures, but also on its resistance to maximum temperatures, and other factors such as lack of water, exposure, soil conditions, length of growing season, etc. It would be impossible to prepare a map depicting all these factors, though several might be included on a complex one. However, since a map based on the average annual minimum temperatures agrees in many instances with the known limits of hardiness of certain plants, these data were adopted as the basis for hardiness zones.

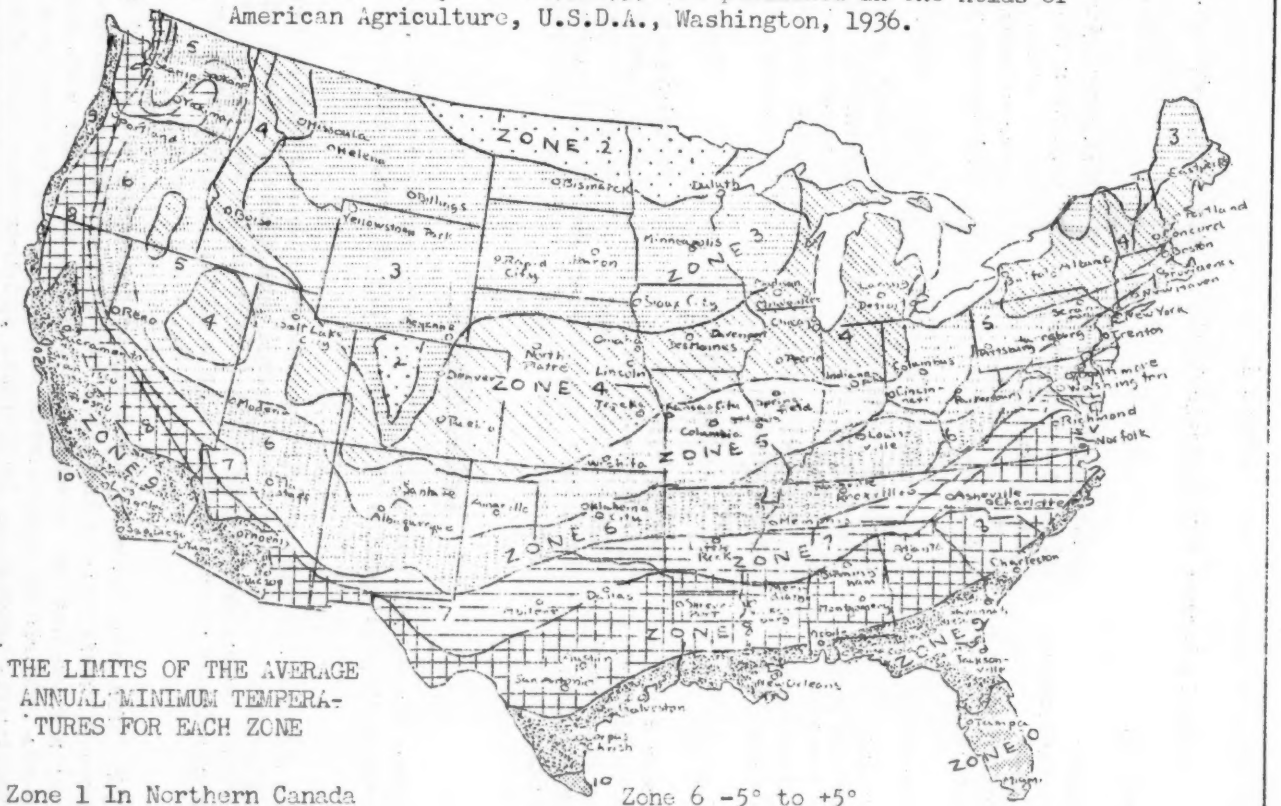
"Figures for the average annual minimum temperatures were published by the U. S. Department of Agriculture in 1936, based on data compiled by the Weather Bureau over a period of forty years, 1895 to 1935, and these figures were used as a basis for the preparation of the Hardiness Map. For this purpose the United States and Canada were arbitrarily divided into ten zones, nine of which are in the United States. These were based simply on 5, 10, or 15 degree differences in the average annual minimum temperatures....."

"On a small-scale map such as this, it is impossible to show all the minute climatic variations within the limits of each zone. In this same connection, certain strains of plants may prove hardier than others of the same species or botanical variety..... If a map of any one of these zones were enlarged, various zone changes would be noted due to altitude alone. The Grand Canyon, for example, appears on our hardiness map in one climatic zone; yet there are at least four climatic zones in this one canyon, due, of course, to variations in altitude. Plants grow at the bottom of the Canyon which thrive in the Mexican deserts, yet on the North Rim (5700 feet above the Canyon floor) plants are found which are native as far north as southern Canada.

"Consequently, many local variations in this small-scale map are to be expected. A plant is usually listed in the coldest zone where it will grow normally, but at the same time it can be expected to grow in many of the warmer zones where maximum temperatures and drought conditions might prove to be the only limiting factors. With these limitations in mind, the following plants are listed in the coldest zones where they can be expected to do well, simply as indicators for the large group of plants doing well in that particular zone....."

HARDINESS MAP

These zones are based on average annual minimum temperatures as listed by the U. S. Weather Bureau for the years 1895-1935 and published in the Atlas of American Agriculture, U.S.D.A., Washington, 1936.



THE LIMITS OF THE AVERAGE ANNUAL MINIMUM TEMPERATURES FOR EACH ZONE

Zone 1 In Northern Canada
Zone 2-50° to -35
Zone 3-35° to -20°
Zone 4-20° to -10°
Zone 5-10° to - 5°
Zone 6 -5° to +5°
Zone 7 5° to 10°
Zone 8 10° to 20°
Zone 9 20° to 30°
Zone10 30° to 40°

WOODY PLANTS HARDY IN DIFFERENT ZONES

Zone I

(This includes the Arctic Regions of northern Canada.)

Zone II	Zone V	Zone VIII
Acer negundo	Abelia grandiflora	Euonymus japonica
Caragana arborescens	Berberis triacanthophora	Ligustrum japonicum
Cornus alba	Ilex opaca	Melia azedarach
Juniperus virginiana	Pieris japonica	Myrtus communis
Prunus virginiana	Taxus cuspidata	Pittosporum tobira
Zone III	**Zone VI**	**Zone IX**
Euonymus alata	Berberis buxifolia	Berberis darwini
Ligustrum amurense	Bignonia capreolata	Cinnamomum camphora
Lonicera tatarica	Ilex crenata	Cotoneaster pannosa
Philadelphus coronarius	Myrica cerifera	Nerium oleander
Pinus strobus	Taxus baccata	Raphiolepis umbellata
Zone IV	**Zone VII**	**Zone X**
Abies concolor	Abelia triflora	Buginvillaea spectabilis
Betula populifolia	Ilex cornuta	Cocos nucifera
Juniperus chinensis	Prunus laurocerasus	Hibiscus rosa-sinensis
Ligustrum vulgare	Pyracantha crenato-serrata	Musa sapientum
Tsuga canadensis	Quercus virginiana	Roystonea regia.

JANUARY WEATHER

(From the U. S. Department of Commerce Weather Bureau, Weekly Weather and Crop Bulletin for the week ending February 4.)

In contrast to last year, there were no outstandingly unfavorable abnormalities in the weather for January, just closed. With temperatures ranging above normal during the greater part of the month, the noteworthy characteristic for the country, as a whole, was the persistent mildness.

The first week brought decidedly cold weather to the far Northwest, where snowfall closed the range and made conditions unfavorable for livestock; dry weather was needed in the South as fields were largely too wet to work. During the second week abnormally low temperatures prevailed in the Southeast, especially in Florida, and there was more or less frost damage, but in other Gulf States conditions were more favorable and winter crops made fairly good progress; the western two-thirds of the country had outstanding warmth. The third week brought heavy rains to the extreme Southeast, which caused further damage to truck crops in Florida,

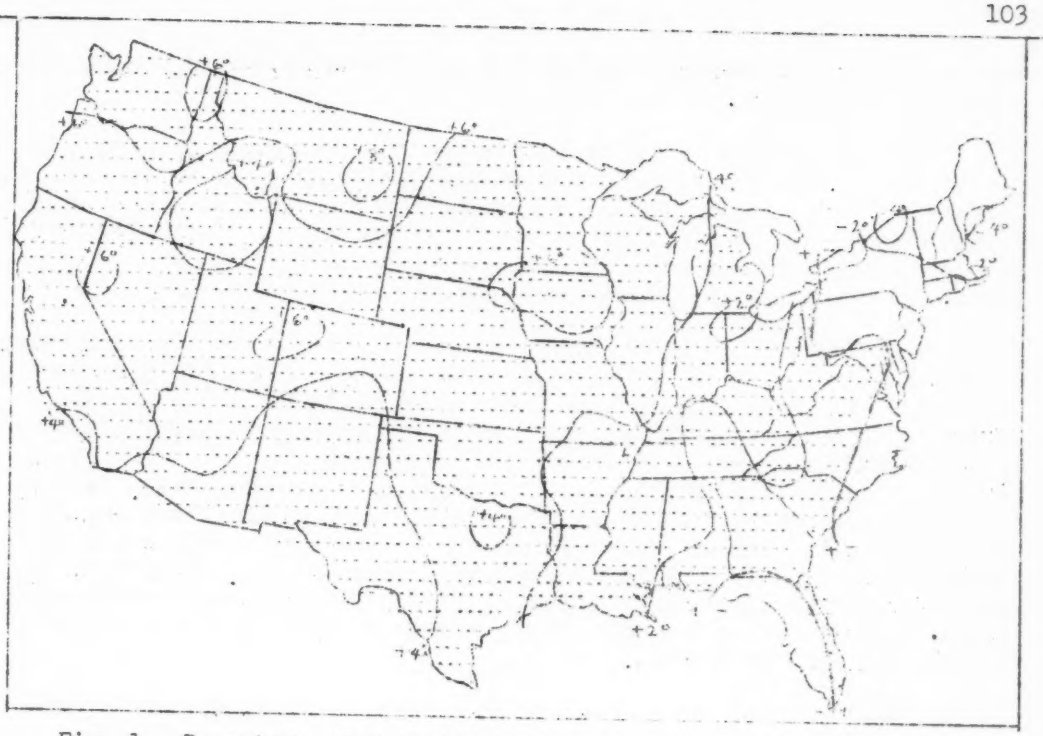


Fig. 1. Departure of Mean Temperature from Normal for January, 1941

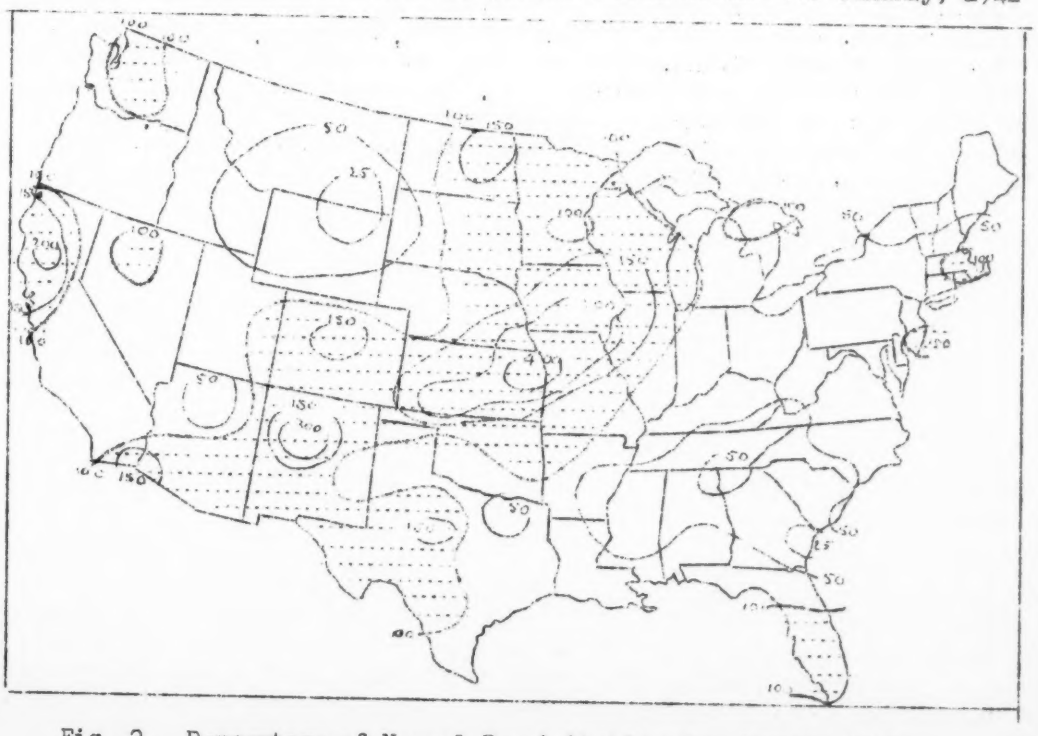


Fig. 2. Percentage of Normal Precipitation for January 1941.

but in other Southern States seasonal temperatures prevailed and crops made fairly good advance.

The latter part of the month brought low temperatures to most of the Great Plains, which, together with snow-covered range, was unfavorable for livestock, but in the South conditions were more favorable. While rainfall during January was mostly light in the Southern States, except Florida, there was much cloudy weather and the soil remained largely too wet to work. However, there was less frost damage than in an average year.

Figure 1 shows that January, as a whole, was abnormally warm everywhere, except in some of the more eastern States, principally in the Northeast, where the mean monthly temperatures were slightly below normal. Everywhere west of the eastern Lake region and the Appalachian Mountains it was a uniformly warm month for the season, with the mean temperature in most sections ranging from 4° to as many as 8° above normal. It will be noted by comparing this chart with the temperature chart for December published in the January 7 issue, that the 2 months show remarkable similarity with regard to departure from normal temperature. It is very unusual for 2 successive winter months to have so similar temperature conditions. Thus the first 2 months of the winter of 1940-41 have been outstanding for uniform warmth.

Figure 2 shows the geographic distribution of precipitation for the month. The amounts were abnormally heavy in the northern half of the Mississippi Valley and from the western Lake region westward to the middle Plains; also, in most of the southern Plains, Colorado, northern New Mexico, and southern Arizona, while the northern half of California and much of Florida were outstandingly wet. In other sections of the country precipitation for the month was deficient, except very locally, the smallest percentages of normal appearing in the Northwestern States and the Southeast, except Florida.